Biology and Biologists of the Buckeye Trail[1]

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The Buckeye Trail provides a good way to focus on both Ohio's historical development and its tremendously varied natural heritage. Nearly 1800 km of trail follow woodland trails, back roads, canal towpaths, pasture cowpaths, forest traces, utility rights-of-way, old railroads, creek beds, fishermen's paths, city sidewalks and occasionally busy modern thoroughfares. The Trail provides a continuous circuit near the perimeter of the state with a spur overlooking the Ohio River in Cincinnati and a spur to Lake Erie at Headlands State Park near Painesville. A dedicated group of volunteers from all parts of Ohio have obtained and blazed rights-of-way, publicized the Trail's existence, and made a reality of the Buckeye Trail Association's slogan "Linking the Four Corners of Ohio". It is to those individuals, past and present, that I dedicate these remarks. Much of what I have seen written about the Trail and included on the trail maps and pamphlets focuses on the hundreds of historical sites from prehistoric Indian times, to pioneer days, to early and modern flight. I've seen relatively little written or said about the natural heritage that the Trail can illustrate so well.

I have attempted in the past year and a half to visit and hike over as much of the Trail as possible. For convenience and local responsibility, the Trail is divided into some 23 sections, each with a route map (Fig. 1) superimposed on a county road map that includes a descriptive guide to the route. Let us examine some of the biology and the biologists that might be encountered in a trip around the Buckeye Trail.

I learned very early that good biology starts with some knowledge of the underlying geology. This begins with the bedrock which provides clues to the past from the fossil fauna and flora. Parent materials derived from varying bedrock tell us something about varied present-day soil habitats. The Buckeye Trail traverses Ohio's oldest bedrock in the southwest part of the state, going through rich Ordovician fossil beds to younger Silurian, Devonian, Mississippian, Pennsylvanian, and Permean bedrock areas. In fact, in one small area of Adams County, the Trail passes formations from upper Ordovician to lower Mississippian. Swinford (1985) recently published an article in *The Ohio Journal of Science* showing the stratigraphy of over 240 m exposed near Peebles, Ohio. He also shows the relationship of the geology here to the nearby Serpent Mound crypto-explosion structure. Many variations of glacial geology are also evident as one walks the till plains interrupted by the hilly moraines, the very flat lake plains, the beautiful rolling areas of the glaciated Allegheny plateau, and the more rugged unglaciated areas of southeast Ohio. Of course, there is also that special area that is geologically and ecologically more like the outer bluegrass of Kentucky, an unglaciated area of thin soils over limestone in Adams and Brown counties.

We begin our trip on the Buckeye Trail in Cincinnati. Eden Park, home of the Cincinnati Art Museum, the Museum of Natural History, and the Kron Conservatory, overlooks the Ohio River. Two unusual animals from quite different origins can be observed here. Kirtland's watersnake (*Clonophis kirtlandi*) named for Jared Kirtland, an early Ohio physician and naturalist, in recent time has been fairly common on the hillsides and in some of the wet spots in Eden Park. It is easily distinguished from other Ohio water snakes by the brick red belly lined by rows of black spots and the regular, checkerboard dorsal pattern. The Missouri, Illinois, Indiana, Michigan, and part of the Kentucky distributions of this species give evidence that this may be one of those "wet prairie" forms that was more widespread formerly and is now found only in a few places. The other animal in Cincinnati that I call your attention to is found along the railroad tracks, walls, and yards near Columbia Parkway close to the Ohio River. This is a population of the European wall lizard (*Lacerta murialis*). This species was evidently introduced into the area earlier in this century and is doing quite well. Its European distribution includes Italy and Spain.

Moving northward, the Trail follows Ohio's longest and narrowest state park, as it follows the right-of-way of the former Penn Central railroad in the Little Miami River Scenic State Park. A good portion of this right-of-way has been paved and has a bridle path alongside. Of perhaps greater interest to the biologist is the Little Miami River, which is one of Ohio's designated scenic rivers. This stream has a rich fauna, particularly the pelecypods. A few years ago I called Dr. David Stansbery at The Ohio State University (Fig. 2), and asked where I could show a class of science teachers the greatest pelecypod diversity fairly close to Oxford. He suggested several sites along the Little Miami River. Several days of canoeing have shown that he was right. I am certain that

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[2]PRESIDENTIAL ADDRESS — Presented at the 95th Annual Meeting of The Ohio Academy of Science held at the University of Toledo, Toledo, Ohio on 26 April 1986. Dr. Paul M. Daniel, Associate Professor of Zoology and Curator for the Hefner Museum of Zoology at Miami University, served as President of the Academy during 1985-1986. He received the B.S. in Education degree from the University of Cincinnati in 1949, the M.S. degree from Miami University in 1954, and the Ph.D. from The Ohio State University in 1965. He served on the faculty of Western College for Women in Oxford, Ohio from 1949-1950, the faculty of Cuttington College, Suacoco, Liberia from 1950-1954, the faculty of the Talawanda Public Schools, Oxford, Ohio from 1954-1959, and has been on the faculty of Miami University since 1959. A Fellow of the Academy since 1980, he served as Director of the Junior Academy from 1979-1984, and has served on the Executive Committee of the Academy since that time. He has had a strong interest in promoting science in secondary schools. He directed Miami Science Day for 13 years and operated several in-service and summer programs for teachers. He has published several technical papers in the fields of herpetology and limnology, and is a member of many scientific organizations including Sigma Xi and Phi Sigma. He has been active in Scouting for 50 years and is an avid hiker.

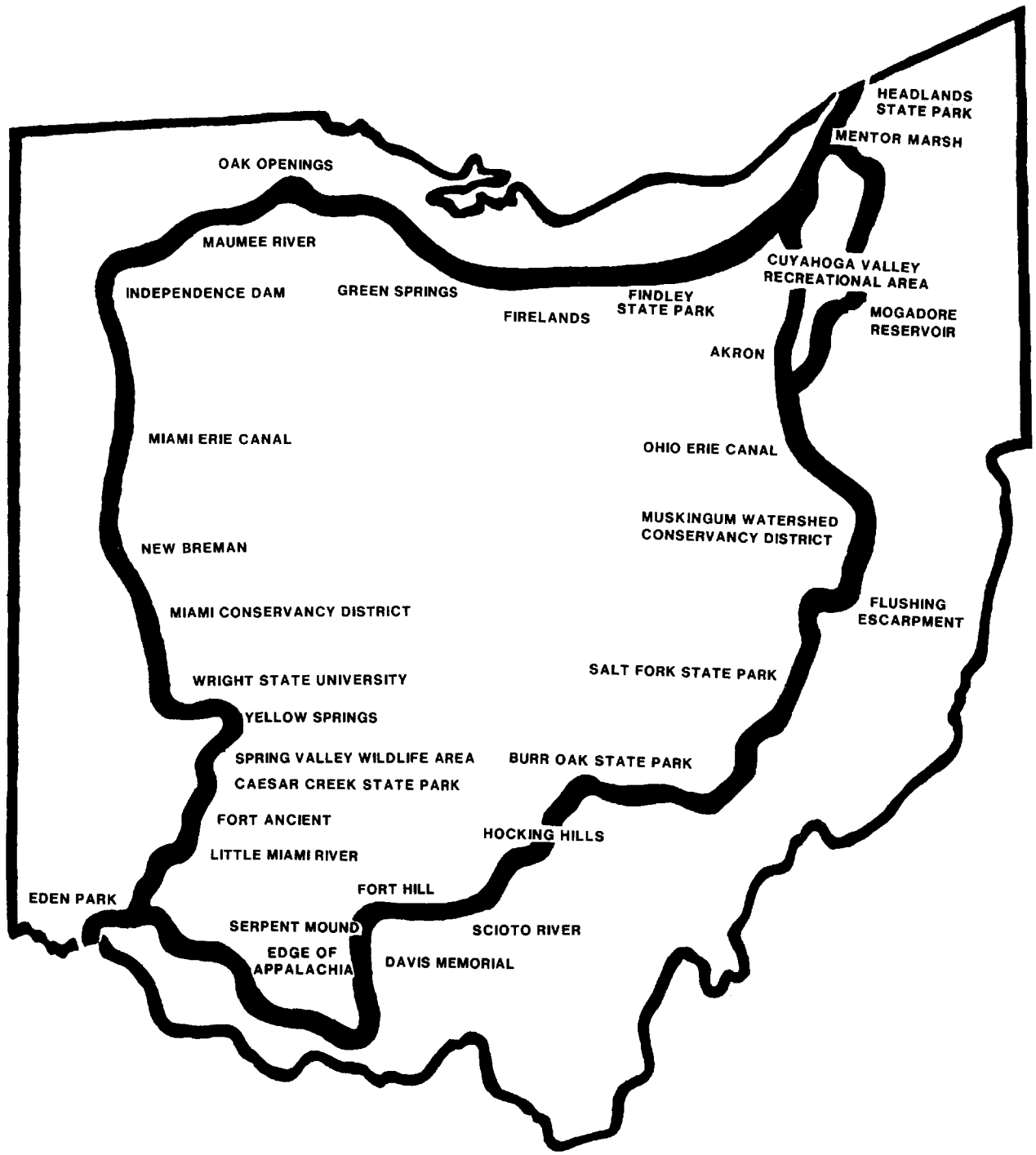

FIGURE 1. Route of the Buckeye Trail showing approximate locations of several locations of biological interest.

the reason that Ohio has such an impressive list of rare and endangered mollusks protected is due to Dr. Stansbery's expertise and leadership in this area. Among the clams found (Fig. 3) are the fragile heel splitter (*Proptera laerissima*), the cylinder shell (*Quadrula cylindrica*), and the bullhead (*Plethobasus cyphus*). One of the projects that I am involved with at our Miami University Zoology Museum is comparing present-day pelecypod fauna with historic material in our collections.

The Trail turns north below the Indian Earthworks at Fort Ancient. This is one of several sites along the Buckeye Trail route that are administered by the Ohio Historical Society. Because of this protection these sites also serve as refuges for plants and animals. The Fort Ancient area represents one of my favorite sites in southwest Ohio to observe mole salamanders (*Ambystoma jeffersonianum* and *A. maculatum*) during their very short breeding season in the late winter.

The Trail also goes through 12 state parks including the one at Caesar's Creek near Harveysburg. Another area traversed by the Trail is the Spring Valley Wildlife Area administered by the Ohio Division of Wildlife. There is a trail in this area known as the Massassauga Trail. Here, if we are lucky, we can find Ohio's smallest rattlesnake,

FIGURE 2. Dr. David Stansbery in the field. (From slide provided by David Stansbery, The Ohio State University)

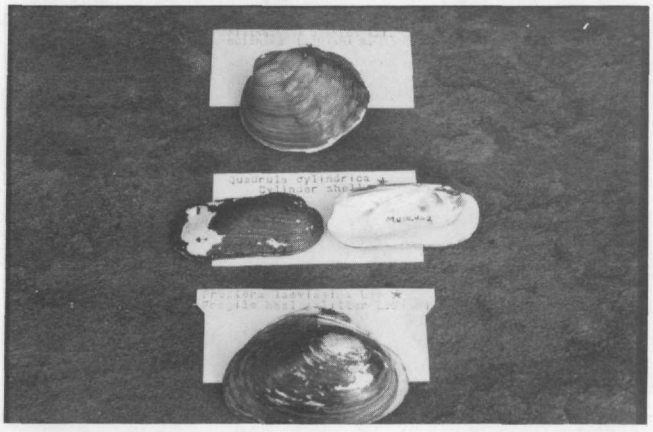

FIGURE 3. Some of the rarer clams of the Little Miami River, Ohio. Top to bottom: bullhead (*Plethobasus cyphus*), cylinder shell (*Quadrula cylindrica*), fragile heel-splitter (*Proptera laevissima*).

the Massassauga (*Sistrurus catenatus*). Crayfish burrows provide hibernacula, and meadow voles provide the summer food supply for this species. Another favorite locality for the Massassauga is the Cedar Bog located between Springfield and Urbana. Drainage and agricultural usage have decreased the available habitat for this species. Perhaps it is time to give the Massassauga rattlesnake "endangered species status" in Ohio (Fig. 4).

Glen Helen, near the campus of Antioch College, is one of several nature preserves traversed by the Buckeye Trail. The village of Yellow Springs is also one of several small towns where the Trail follows sidewalks and passes old houses. Between Fairborn and Dayton, the Trail passes the memorial to the Wright brothers, which overlooks the Huffman Prairie where early manned flight trials took place. One can also find an Indian burial mound as well as an overlook for Wright Patterson Air Force Base, one of the nation's busiest air force bases. I am also told that many of the fringe areas here provide habitat for the Massassauga rattlesnake. Along the way one passes Wright State University. Here you might see Dr. Jerry Hubschman, a past president of The Ohio

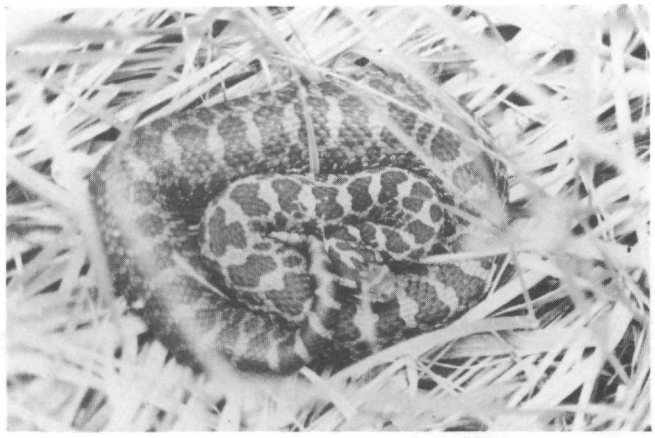

FIGURE 4. Massassauga rattlesnake (*Sistrurus catenatus*) camouflaged in the grass. (From slide provided by Ralph Mansik)

Academy of Science and the zoologist who taught me much about Lake Erie invertebrates. Today we learned of the host-parasite relationship of *Tanaorhampus longirostris*, an acanthocephalan parasite in gizzard shad (*Dorosoma cepedianum*), with intermediate stages in the calanoid copopod, *Diaptomus pallidus* (Hubschman 1986).

North from Dayton the Buckeye Trail runs along the Great Miami River through lands of the Miami Conservancy District. Another of Ohio's pioneers should be recognized here. Arthur Morgan, engineer, college president, architect of the Miami Conservancy District and much of the TVA (Fig. 5) was instrumental in the construction of a series of flood control dams in the watersheds of the Great Miami, Stillwater and Mad rivers. These were built to prevent a reoccurrence of the 1913 floods. One of the high spots in an institute for high school teachers held on Saturdays a few years ago was the visit of Arthur Morgan. He described how the Miami

FIGURE 5. Arthur Morgan and Colonel E. A. Deeds discuss the Miami Conservancy District. (Courtesy of the Miami Conservancy District)

Conservancy District was formed over 50 years ago. He accompanied the teachers to one of the dams, examined it, and explained that some of the concrete was cracking a little, perhaps due to inferior material that had to be used during World War I.

The dams were constructed to impound water in the flood plains only during floods. The rest of the time these areas provide good wildlife habitat. Mutter et al. (1984) documented that the reserves serve as nesting areas for seven birds of prey, with winter visits and sightings of eight others including the fish hawk or osprey (*Pandion haliaetus*). A total count of 54 nesting pairs of raptors was made in an area of 27 km.

The Buckeye Trail follows the towpath near the Miami-Erie Canal for many km north to the Maumee River. At many places old canal locks, aqueducts, and other structures are still in evidence. North of Piqua you can ride on the General Harrison canal boat pulled by a mule (Fig. 6). I highly recommend the ride along this section of the Canal which has been cleaned up and put into shape. Watch for painted turtles (*Chrysemys picta*) and soft shell turtles (*Trionyx spiniferus*) as you glide along.

In some places the Canal has been used as a landfill; in others it serves as a wetland refuge for waterfowl and other wildlife associated with wetlands. In places it is navigable as a canoe trail. Along the way you become familiar with canal towns such as New Bremen, Fort Laramie, St. Marys, Delphos, and Deep Cut. The towpath makes for easy walking in places; in others it is quite overgrown with vegetation, making it necessary to walk over nearby roads. At one spot near New Bremen I found the old mile marker nearly covered with weeds.

As we move north into the Auglaize and Maumee drainages, one is reminded of past bodies of water that preceded Lake Erie. One of several women who has had a big influence on my life is Dr. Jane Forsyth (Fig. 7), glacial geologist and former Editor of *The Ohio Journal of Science*. I don't know how many times, both accidentally and sometimes on purpose, that I have run into Jane since my undergraduate days at Miami University, where Jane served as an instructor in the Geology Department. It is worth a side trip off the trail to the Oak Openings Metro Park to walk through the dunes of this unique area. Look for two animals that are unique to this part of Ohio:

FIGURE 7. Dr. Jane Forsyth (foreground) explaining glacial geology to a group of secondary teachers.

Blandings turtle (*Emydoidea blandingi*) (Fig. 8) and the fox snake (*Elaphe vulpina*). Both are fairly common hereabouts, but are just not found elsewhere in the state.

Another biologist that one associates with the Toledo area is Roger Conant, who in the 1930s worked at the Toledo Zoo where he began a project documenting the reptiles of Ohio, which still serves as a model state survey. Each weekend during spring, summer, and early fall Roger and several young men from Toledo would visit various regions of the state to collect reptiles which were carefully measured, described, and had scale counts recorded for an article in the *American Midland Naturalist* which later was bound in book form as the *Reptiles Of Ohio*. I was privileged, as I am sure some of you were, to be part of the revision and addenda of that book which was published in 1951. In Figure 9, Roger is shown with Reeves and Joseph Bailey and Charles Walker on the steps of the cabin owned by Ed Thomas in Hocking County. Dr. Thomas was a former president of The Ohio Academy of Science and director of the Ohio State Museum.

As one goes east on the Buckeye Trail, such places as Green Springs, Fremont, and Findley State Park are on the route. Much of the Trail is on gravel roads through farmland that was part of the Firelands of the Western

FIGURE 6. Canal boat on section of restored Miami—Erie Canal near Piqua, Ohio.

FIGURE 8. Blandings Turtle (*Emdoidea blandingi*). (Courtesy of the Ohio Department of Natural Resources)

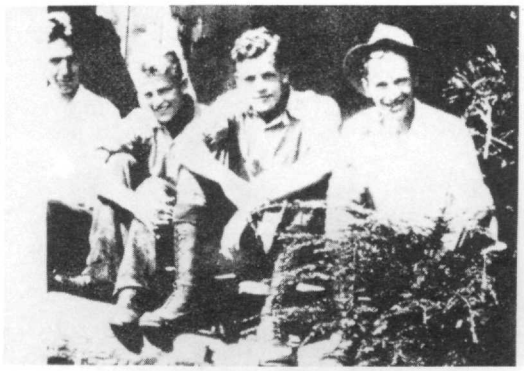

FIGURE 9. Charles Walker, Joseph Bailey, Reeve Bailey and Roger Conant in front of Ed Thomas' shack in southern Ohio in 1931. (Courtesy of Roger Conant and Toledo Herpetological Society)

Reserve. This was land obtained by Connecticut from King James I in 1630 and later confirmed by Congress in 1800 as belonging to Connecticut. The western end of the Reserve was set aside for those whose homes were ravaged by fire at the hands of the British at the end of the American Revolution — hence the name Firelands.

To the biologist the open lands of the Western Reserve are prime territory for shore and marsh birds. On one trip to Crane Creek, which is north of the Trail, to observe warbler migration, we encountered more bird watchers than birds, and were told that along certain roads to the south that an Eurasian Curlew (*Numenius arquata*) had been observed among a flock of Dunlins (*Calidris alpina*) and Dowitchers (*Limnodromus* sp.). I can't say that I saw the curlew, but I did get a good feel for the rich shore birds of this region. Another bird to note in this area is the upland sandpiper (*Bartramia longicauda*) which is becoming rare in Ohio. Originally, it was found only in a few open areas of Ohio and then became more widespread with forest cutting. Now with increasing urbanization it is less common (Osborne and Peterson 1984). Airports serve as major refugia for this species.

In the Akron-Cleveland-Painesville area the Buckeye Trail has parallel routes northward — one through the city of Akron and another along the edge of beautiful Mogadore Reservoir. One biologist that I have come to know and respect in this area is former Academy president Ralph Dexter of Kent State University (Fig. 10). Ralph has for years kept us up-to-date on the activities of the chimney swifts (*Chaetura pelagica*) living on the roofs of the Kent State buildings and, more recently, the changes in the tidal flora and fauna in Cape Ann, Massachusetts. So from snails to freshwater jellyfish, from the history of science in Ohio to chimney swifts, we salute Ralph Dexter.

The Buckeye Trail goes eastward and northward to Lake Erie. An area here that I would like to visit again, perhaps in better weather than my first visit in June, 1985, is Mentor Marsh, which is an old channel of the preglacial Grand River that emptied into Lake Erie at the present site of Mentor Yacht Club. This area is characterized by five distinct communities: swamp forest, thorn scrub, marshland, open water, and sandy beach and dune. Over 200 species of birds have been found in the area. Although the Buckeye Trail goes across the Mentor

FIGURE 10. Dr. Ralph Dexter of Kent State University. (Photo provided by Ralph Dexter)

Marsh, my advice is to use several of the side trails as well.

The vegetational history of Mentor Marsh has been documented by Bernstein (1981). Evidently, the area was largely open water until the early 1800s and then became covered with swamp forest. Since 1959, this forest has diminished greatly in size. Now the dominant plant is the common reed, *Phragmites australis*. One of the questions here is what role has high salt concentration had in determining the present plant composition of Mentor Marsh.

One of the animal species of interest to those associated with Lake Erie fisheries is the lamprey, *Petromyzon marinus*. To study lampreys, one must get involved with the ammocoetes that live in tributary streams. The secretary (now president-elect) of The Ohio Academy of Science, Dr. Andrew White of John Carroll University, (Fig. 11) and his student Tom Rosegger, have been carefully monitoring ammocoetes and adult populations of these animals. He indicates that there is reason for concern because of increasing ammocoete populations in some of the tributaries of Lake Erie. Today we learned of northern brook lamprey (*Ichthyomyzon fossor*) populations in some of these same streams (Rosegger and White 1986).

On stretches of the Trail southward, one is again reminded of the canal-building era in the second quarter of the 1800s. Ohioans were determined to provide routes for moving their agricultural products to eastern markets. The debate at the time was whether to develop the Miami-Erie western route or the more easterly Scioto-Tuscarawas route. In typical Ohio style, both were built with appropriate branches and feeders. Canal Fulton with its restored canal boat, canal museum, and navigable canal is testimony to the important role of canal transport in Ohio. Once again, the canal tow path reveals good evidence for the old canal beds as wetland habitats.

Another feature of this part of the Buckeye Trail is the Muskingum Watershed Conservancy District. Among

FIGURE 11. Dr. Andrew White and sea lamprey (*Petromyzon marinus*). (From slide provided by Andrew White, John Carroll University)

FIGURE 12. Dr. Ray Jezerinac in the field. (From slide provided by Ray Jezerinac, The Ohio State University-Newark)

the parks and lakes that the Trail traverses here are Atwood, Leesville, Tappan, Clendening, and Piedmont. A feature indicated on many maps depicting Ohio land forms is the Flushing Escarpment which separates the high gradient streams to the east to the Ohio River from the more moderate gradient to the west in the Muskingum Watershed. The extent of faunal differences has been an interesting question addressed by several biologists and naturalists, including Forest Buchanan and Orville Burch. One animal which shows this is the mud minnow (*Umbra limi*), which was probably widespread and abundant in the northern two-thirds of glaciated Ohio, but uncommon in the unglaciated area. Another zoologist one might encounter in a number of places both on and off the Buckeye Trail is Dr. Ray Jezerinac of the Newark Campus of The Ohio State University (Fig. 12). We usually think of Ray in connection with rare crayfish, and I am sure that if you are willing to look for them, Dr. Jezerinac will give you a lesson on how to distinguish the rare forms from our more usual varieties. Today, we learned of *Orconectes sloani* and other forms in several areas of Ohio.

An animal that may be encountered at several places along the Buckeye Trail route, where it crosses bogs or passes permanent springs, is the seldom seen four-toed salamander (*Hemidactylium scutatum*) which is one of four salamanders designated as "endangered" in Ohio (Fig. 13). It has the distinction of being Ohio's smallest salamander as an adult. It also has the unusual ability to move its tail which, in turn, may be disconnected from the body voluntarily at a visible joint, thus saving the animal's life. Females of this species remain with their egg clutches for a considerable time. *Hemidactylium scutatum* is distributed throughout the state in undisturbed, permanently wet places.

The Buckeye Trail passes agriculture in many forms including several regions where Amish farms are found.

FIGURE 13. Four-toed salamander (*Hemidactylium scutatum*), one of Ohio's rare and endangered animals. (Courtesy of the Ohio Department of Natural Resources)

Foster (1984) examines the shift of many Amish workers off the farm and the rise of cottage industry among them. He concludes, however, that adaptation to changing conditions is not diminishing the Amish life style in Ohio.

Evidence of mammals such as tracks, scat, and road kills are seen more frequently than the actual animals. One interesting animal observed along the Trail was the hairy tailed mole (*Parascalops breweri*), which I found along the shore of Burr Oak Lake. This was particularly interesting to me for in western Ohio we find the prairie mole (*Scalopus aquaticus*). The hairy tailed mole is more of a woodland form found in eastern Ohio.

Evidence of past mining is apparent along the route of the Buckeye Trail in southeastern Ohio. Burr Oak Lake is on the site of old strip mines and provides a beautiful setting for Burr Oak State Park which has multiple recreational usage. Some other mining sites haven't fared as well; for example, the area drained by Lost Run. Deep

mines and strip mines are evident along this stretch of Trail. Oil is also being pumped from this same region by coal companies.

One of the most used sections of the Buckeye Trail runs through the Hocking Hills Park area between Ash Cave and Old Man's Cave via Cedar Falls. On a backpacking expedition through that area, I had encountered several days of rain and was delighted to see some glorious May sunshine. I decided to spread out my wet sleeping bag, tent, and other belongings in a power line cut. It wasn't long before I saw a white net appearing over the horizon on an opposite hillside. This was followed by another, and another. Each was attached to a person, some larger than others. As they approached it was obvious what they were doing, and I inquired as to what kinds of lepidopterans they were seeking. They were surprised that I knew the word. This was my introduction to one segment of the spring foray of the Ohio Lepidoptera Society. Here were biologists I actually did meet on the Buckeye Trail.

From the Hocking Hills area, the Buckeye Trail runs south and west through Tar Hollow Forest, crosses the Scioto River, traverses Pike Lake State Park and Pike Lake State Forest, and goes to Fort Hill Memorial. These areas are beautiful at any time, but I particularly recommend spring.

North of the Buckeye Trail in the Scioto drainage one encounters Big Darby Creek. The scientist you might find here or on any nearby stream is Dr. Milton Trautman. At "Trautman's Riffle" near Circleville bluebreasted and Tippecanoe darters (*Etheostoma camurum* and *E. tippecanoe*) and a large variety of other fish may be found.

Another contributor to Ohio's Natural Heritage has been Mr. Floyd Bartley (Fig. 14), who farmed in the Circleville area for many years and contributed many plants, including some new species, to the herbaria at The Ohio State University and Ohio University. Again, I was privileged to have Mr. Bartley join us on one of our Saturday field trips with high school teachers a few years ago. It was difficult to go very far without a complete explanation of a plant's habitat requirements. Therefore, on this rainy day a small group stayed with Mr. Bartley, while the rest of us pulled seines and turned over rocks hunting for salamanders.

FIGURE 14. Floyd Bartley, an outstanding contributor to the knowledge of Ohio's flora. (From *Ohio's Natural Heritage,* The Ohio Academy of Science)

It is obvious that I've saved the best till toward the end, where the Trail goes south through the Ohio county with the greatest biological diversity — Adams County. Davis Memorial, a region administered by the Ohio Historical Society, has several biological and geological features. The cane-brake (Fig. 15) is one of the largest I have seen in Ohio and represents a plant association frequently observed much further south in Kentucky. Tobacco is a prominent crop along roadsides and in the hollows of this area.

Fortunately, the value of this part of Ohio's natural heritage has been recognized by many persons and groups and the Ohio Historical Society with its stewardship of Serpent Mound and Davis Memorial. The joint efforts of the Nature Conservancy and the Cincinnati Museum of Natural History have resulted in the series of Edge of Appalachia preserves along the east side of Ohio Brush Creek. One prominent feature here is Buzzard's Roost Rock, which is now accessible by the trail off Weaver Road. Nearby are pockets of relict prairie. The unique nature of these areas, which are found on some of the poorer soils, was shown by Dr. Lucy Braun of the University of Cincinnati (Fig. 16). We were fortunate a few years ago to have Dr. Braun accompany a group of Ohio teachers through some of these areas. The one near Lynx is perhaps the most studied and bears her name. To burn or not to burn, to cut or not to cut invading hardwood and pine are questions without simple answers faced by those charged with maintaining the prairies.

The Ohio Natural Heritage Program singles out Adams County as having more unusual elements than any other in the state. Those of us who have spent time there would concur. A unique member of the fauna here is the green salamander (*Aneides aeneus*), which lives in crevices on cliff faces. It is another of Ohio's "endangered" species.

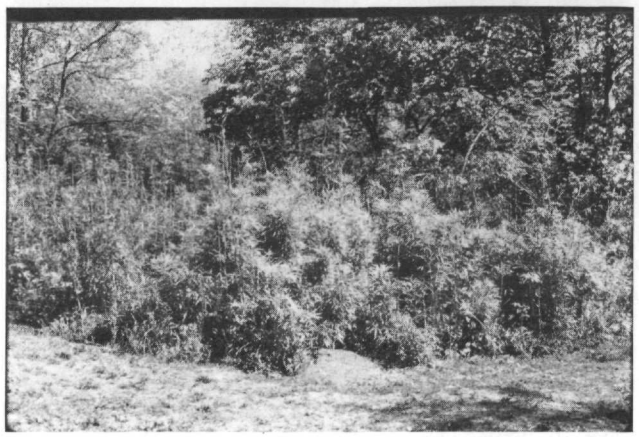

FIGURE 15. Canebrake near Davis Memorial in Adams County, Ohio.

FIGURE 16. Dr. Lucy Braun interprets Lynx Prairie.

Let me sum up. In today's parlance what is the "bottom line" of this walk along the Buckeye Trail? I suggest the four Es.

Endangered. Ohio has recognized a portion of its fauna and flora as being threatened or endangered. Nearly all who examine this come up with habitat protection as the key to survival of rare forms. This is certainly true for Ohio. I think the encouraging sign is the recognition of the need for both more information on rare forms and land acquisition as nature preserves. These are both parts of the tax check-off plan. I hope that you support this and will encourage its continuation.

Enquiry. When we compare what is not known with what has been done, we are humbled by the unknown features of both individual species and the communities and ecosystems that they are a part of. One of the great strengths of *The Ohio Journal of Science* is its willingness to disseminate information on Ohio fauna and flora. Let's keep it that way.

Educate. The varied lessons of the Trail are there for the learning. Use them.

Enjoy. Great sections of the Buckeye Trail — some near your homes — are used very little. Take advantage of the greatest and longest state trail in the nation. You'll be glad you did!

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